

What is claimed is:

1. A surface acoustic wave element including:
 - a sapphire single crystal substrate;
 - a hard layer formed on said sapphire single crystal substrate and having a composition containing $(Al_{1-x}M1_x)_2O_3$ ($0 \leq x \leq 0.5$) in which at least one element M1 (M1 = B, Ga, In, Ti, V, Cr, Mn, Fe, Co) is added to sapphire; and
 - a piezoelectric layer formed on said hard layer.
2. A surface acoustic wave element according to claim 1, wherein said hard layer has a corundum crystal structure.
3. A surface acoustic wave element according to claim 1, wherein said piezoelectric layer has a composition containing $(Al_{1-x}B_x)N$ ($0 \leq x \leq 0.5$) in which boron nitride is added to aluminum nitride, and has a wurtzite crystal structure.
4. A surface acoustic wave element according to claim 1, wherein said piezoelectric layer has a composition containing $(Zn_{1-x}M2_x)O$ ($0 \leq x \leq 0.5$) in which at least one element M2 (M2 = Li, Mg, Fe, Co., Ni, Cu) is added to zinc oxide, and has a wurtzite crystal structure.
5. A surface acoustic wave element including:
 - a single crystal substrate having a composition containing $(Al_{1-x}M1_x)_2O_3$ ($0 \leq x \leq 0.5$) in which element M1 (M1 = B, Ga, In, Ti, V, Cr, Mn, Fe, Co) is added to sapphire, and having a corundum crystal structure; and
 - a piezoelectric layer formed on said single crystal substrate.
6. A surface acoustic wave element according to claim 5, wherein said piezoelectric layer has a composition containing $(Al_{1-x}B_x)N$ ($0 \leq x \leq 0.5$) in which boron nitride is added to aluminum nitride, and has a wurtzite crystal structure.
7. A surface acoustic wave element according to claim 5, wherein said piezoelectric

RECORDED BY AUTOMATIC RECORDING SYSTEM
APR 26 1988

layer has a composition containing $(Zn_{1-x}M2_x)O$ ($0 \leq x \leq 0.5$) in which at least one element M2 (M2 = Li, Mg, Fe, Co., Ni, Cu) is added to zinc oxide, and has a wurtzite crystal structure.

Subj027

8. A frequency filter including:

a first electrode formed on the piezoelectric layer equipped with any one of the surface acoustic wave elements of claims 1 through 7; and

a second electrode which is formed on said piezoelectric layer and which converts to an electrical signal by resonating to a specific frequency or a frequency of a specific band of a surface acoustic wave generated in said piezoelectric layer by an electrical signal applied to said first electrode.

9. A frequency oscillator including:

an electrical signal application electrode which is formed on the piezoelectric layer equipped with any one of the surface wave acoustic elements of claims 1 through 7 and which generates a surface acoustic wave in said piezoelectric layer according to an applied electrical signal; and

a resonance electrode which is formed on said piezoelectric layer and which resonates a specific frequency component or a frequency component of a specific band of the surface acoustic wave generated by said electrical signal application electrode.

10. An electronic circuit including:

the frequency oscillator according to claim 9; and

an electrical signal supply element which applies an electrical signal to the electrical signal application electrode provided in said frequency oscillator; wherein,

a specific frequency component is selected from the frequency components of said electrical signal or the frequency components of said electrical signal are converted to a specific frequency component, or a prescribed modulation is imparted to said electrical signal followed by a prescribed demodulation or prescribed wave detection.

Subj027

11. An electronic apparatus including at least one of the frequency filter according to claim 8, the frequency oscillator according to claim 9, and the electronic circuit according

SEARCHED INDEXED
SERIALIZED FILED

Subj to claim 10.
L1103